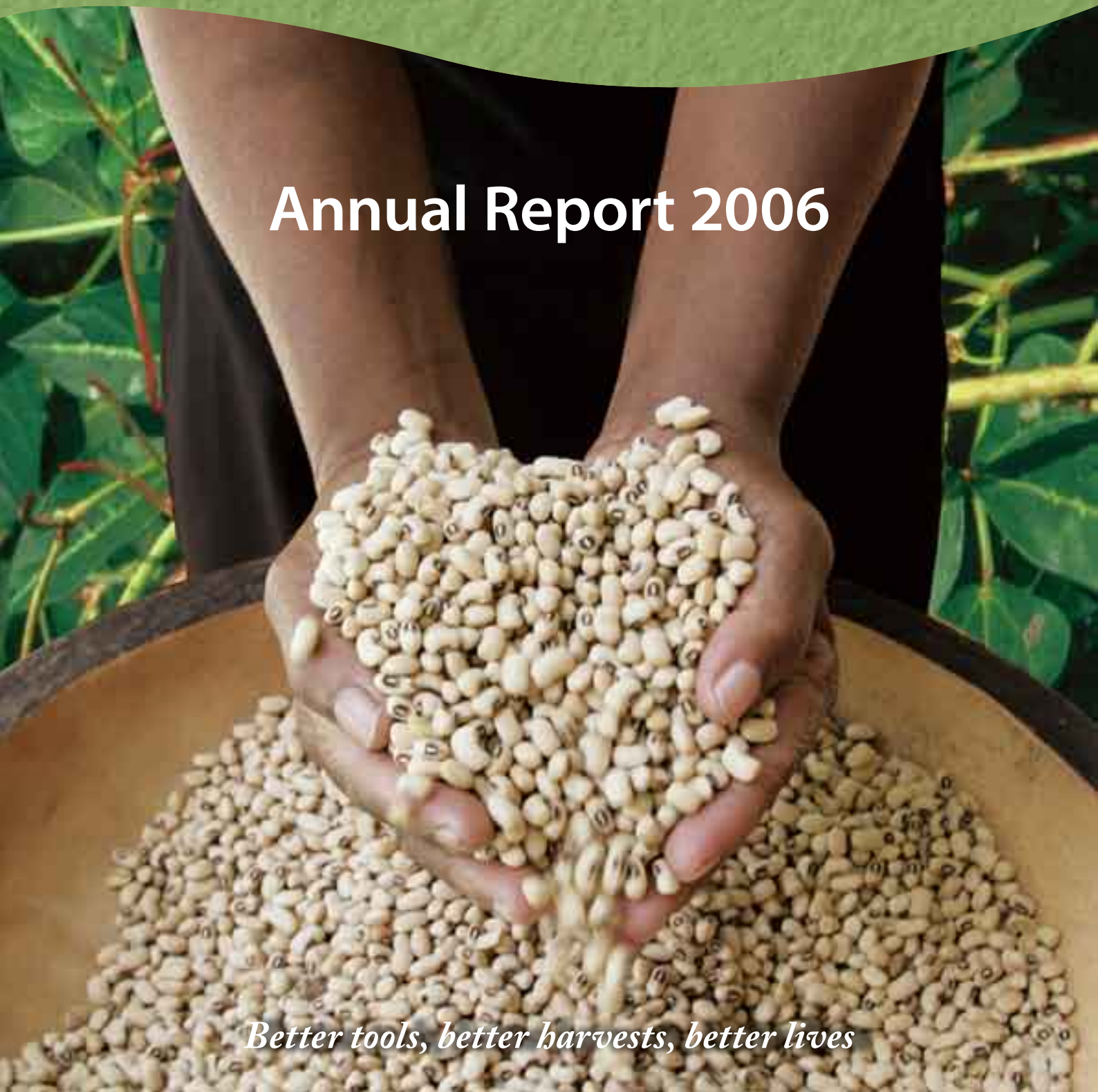
AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

Delivering the Promise

Impacting Lives with New Technologies



Annual Report 2006

Better tools, better harvests, better lives

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AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
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better tools, better harvests, better lives *mieux s'outiller pour récolter plus et vivre mieux*

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The Masks

Bwa Plank Mask (north-west Burkino Faso and Mali): Page 1. Bwa masks are the embodiment of bush spirits. These represent the natural forces on which all life depends and they are invoked to benefit humankind. The masks are used after the harvest to facilitate integration in village culture and promote respect for the rules of proper social behaviour.

Punu Mukudj Mask (Gabon): Page 5 and 30. Punu *mukudju* masks represent lovely maidens with their rounded contours, naturalistic proportions, slit eyes, arched brows, full lips and ornate coiffures. Red scarification patterns tell us that the mask represents a female character. She is a beautiful young woman who has returned from the spirit world to participate in village life. Such masks are still worn at ceremonies and funerals and bring joy to the community.

Kwele Ekuk Mask (Congo and Gabon): Page 7. The Kwele believed that in order for the healing powers of the ancestors to be effective in times of crisis the community had to reach a certain level of energy or 'heat'. To bring themselves to the necessary heated state, the community invited forest spirits, *ekuk*, to lead them in dance.

Baule, Yaure, Guro Ngblo Masks (Côte d'Ivoire): Page 10, 14, 19 and 25. These masks, called *ngblo* (*mblo*), can largely be considered to be entertainment masks. They are worn by male dancers who perform in public theatres as well as funerals. The masks represent social roles or may be inspired by the beauty of real people.

Possibly Ibibo Mfon Ekpo Mask (Nigeria): Page 12 and 23. *Ekpo* is the Ibibo word for 'ancestor' and is also the name of their principle masking society. White or yellow faced masks come out during daytime to participate in the burial festivals honouring the recently deceased and at agricultural festivals. Their appearance at agricultural festivals is important because it is the ancestors who watch over the fertility not just of the family but of the crops and livestock as well.

Fang Ngil Mask (Gabon and Equatorial Guinea): Page 16 and 21. The *ngil* institution held judicial and political power and would be involved in the affairs of several villages. The function of *ngil* was to combat sorcery, evil practices and those who were disrespectful in dealing with society members. They also adjudicated between clans during conflict and rivalry.

Bamana/Marka Mask (Mali): Page 28. The Bamana association called *Ntomo* is concerned with the sacred power, *nyama*. This society organises young boys into age grades, trains them and ultimately oversees and arranges their ritual circumcision. These boys wear masks as part of their training and the masks allude to the principles of conduct they are in the process of learning.

Dan Hornbill Masks (western Côte d'Ivoire): Page 34. According to Dan mythology, forest spirits, which may take the form of the hornbill, who wish to participate in the world of the living choose a partner from the village community. They show him what costume and mask he needs to wear to allow their spirit to become manifest. These masks are often simply joyous and playful companions, but an old and powerful forest spirit will give a village leader power to see that order and stability are maintained within the community and that wrongdoers are punished.

For more detailed information, please visit our website: www.aatf-africa.org

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Knowledge is like a garden: if it is not cultivated, it cannot be harvested.

African Proverb

The friends of our friends are our friends.

Congo Proverb

Message from the Board Chair

The role of AATF as an established partner for change in agricultural research and development in Sub-Saharan Africa received a major boost in June 2006 when Kenya formally recognised the Foundation as a fully fledged international organisation, with all the rights and privileges associated with such recognition.

The agreement, signed by Kenya's Minister of Foreign Affairs, reflects the Government's commitment to supporting AATF's work on behalf of the poor in all Sub-Saharan Africa countries. It also sends a clear message that AATF is in business for the long term and greatly strengthens our ability to bring proprietary agricultural innovations to the region.

Our operational capacity was further strengthened through Memoranda of Understanding with the Forum for Agricultural Research in Africa (FARA), the West and Central African Council for Agricultural Research and Development (CORAF/WECARD), the Centre National de Recherche Agronomique (CNRA) in Côte d'Ivoire, and by our official recognition as a non-profit, charitable, tax-exempt organisation in the United States under section 501(c)3 of the US Internal Revenue Code.

Beyond these institutional developments, we also made significant progress in a number of key activities throughout the year.

We are especially excited by progress towards commercialising Strigaway® maize and moving the technology from large-scale field testing into commercial production. The technology has shown great promise for improving farmers' yields and reducing field infestation by *Striga* and we are confident that it will have great impact on the livelihoods of poor farmers now that it is commercially available.

On technology access, a royalty-free license agreement was signed with Academia Sinica (Taiwan) that allows AATF to use their proprietary technology to produce new banana varieties with resistance to banana bacterial wilt, providing hope in the fight against this devastating disease. In addition to moving forward with these major initiatives, we continue to develop new potential product concepts (four of which are highlighted later in this Report).

In 2006 we made considerable progress towards finalising the AATF Strategic Plan, 2007–2015 (see pp 30–33). The Board was pleased with Management's decision to develop the AATF long-term strategy through a participatory process that saw the involvement and contribution of a number of our stakeholders. The results of the process will impact the Foundation's way of doing business for the foreseeable future. The crucial outcome of the process is that AATF's role in and contributions to agricultural development in Sub-Saharan Africa is clearly recognised by those involved in African agricultural R&D as offering considerable potential for success.

During the year, we admitted two new members to the Board – Dr Wilson Songa, Government of Kenya representative, and Dr Yongbiao Xue, a national of China who is Director, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences. We also bid farewell to one member, Dr Vincent Gwarazimba from Zimbabwe, who retired after serving two terms. The new members will bring fresh perspectives to the Board, and Dr Gwarazimba will continue to be a great source of support, both to the Board and to Management.

I am pleased to say it has been an excellent year for the Foundation, and I take great pleasure in thanking AATF's stakeholders – our financial investors, technology donors, and our many R&D partners and advisors – all of whom share our vision of creating new opportunities for resource-poor farmers in Sub-Saharan Africa, and for eradicating hunger and poverty in the region.

Prof Jennifer Ann Thompson
AATF Board Chair

Between true friends even water drunk together is sweet enough.

African Proverb

Message from the Executive Director

Since its inception, AATF's efforts have been guided by its institutional business plan. This approach has led to notable achievements, some of which came to fruition in 2006 and are mentioned below and detailed elsewhere in this Report. Three years of operational experience had, by the end of 2005, provided the Foundation with many valuable insights into what it would take to realise our goals. As a continuously learning organisation, we sought to build on the practical lessons gained so far and to formally assess, with the full participation of our many stakeholders, the progress we have made and the future directions we should take.

The outcomes of this process are documented in a new publication, *Bridging the Gap to New Technologies for Smallholder Farmers in Africa: The AATF Strategy, 2007–2015*. This 10-year strategy is fully consistent with the Foundation's business plan, but adds clarity to AATF's directions and presents them in a form more accessible to an interested general audience. The strategy document will also serve as our primary operational guide

in deciding on priorities and implementing activities in the pursuit of our mission.

Our strategic directions were defined in several stages through a highly participatory process. In early 2006, we organised a series of internal discussions and debates about achievements and challenges, strategies and objectives, and our perceived strengths, weaknesses, opportunities and threats. In June 2006, we held a three-day workshop in Nairobi involving an array of representatives from the private and public sectors – including specialists in agricultural and biological research, regulatory matters, intellectual property management, public awareness and technology acceptance, agricultural industry, African seed systems, and information and knowledge management. The results of this workshop were synthesised into six short (500 word) strategy statements relating to the key components of our work and were shared with over 200 stakeholders who were asked to provide constructively critical feedback. A subset of these stakeholders was then invited to another workshop in September 2006 which focused on analysing the draft strategic direction document, the feedback from stakeholders, and the strategic positioning of the Foundation.

The results of this process include a reaffirmation of the Foundation's vision, mission, values and principles. We have gained clarity as to how we can best implement our three redefined strategic thrusts: negotiating access to proprietary technologies; establishing and managing public/private partnerships; and managing knowledge and information in support of project formulation, product development and deployment, and the creation of a more conducive policy environment for R&D in Sub-Saharan Africa.

Even as we planned for the future, we continued to move forward in 2006 with the technical aspects of our work. Significant among our achievements this year was the signing of a royalty-free Technology License Agreement with Academia Sinica of Taiwan. This Agreement gives the Foundation access to Academia Sinica's plant ferrodoxin-like protein (*pflp*) gene from sweet pepper, which is being used for the genetic transformation of bananas to produce varieties resistant to banana bacterial wilt. AATF has granted a sublicense to the International Institute of Tropical Agriculture (IITA) to use the *pflp* gene in banana transformation work, adding impetus to this important work. The cowpea transformation work against pod-boring insects, which makes use of the Monsanto proprietary *cry1Ab* gene, overcame some major hurdles and has yielded transgenic cowpea plants with high levels of gene expression. Preliminary efficacy tests on these plants showed a high level of resistance against *Helicoverpa armigera*, an insect pest of the same family as *Maruca vitrata*.

At the corporate level, the Government of Kenya signed with AATF a Host Country Agreement, officially recognising the Foundation as an international organisation in Kenya with all necessary privileges and immunities. This status will facilitate and enhance the functional capabilities of the Foundation to carry out its work, both in Kenya and other African countries.

Towards the end of 2006, AATF launched, under the patronage of the Minister of Science and Technology of the Government of Kenya, a strategic initiative known as the Open Forum on Agricultural Biotechnology (OFAB), which is now providing a much-needed monthly platform for the exchange of factual information among stakeholders in agricultural biotechnology. This forum is accessible to the media, and to those who develop policies and regulations. The aim of the Forum is to ensure that everyone, including the general public, has an opportunity to find home-grown answers to questions on agricultural biotechnology in Africa. The International Service for the Acquisition of Agri-biotech Applications (ISAAA) Afri-Center has teamed up with AATF to co-organise OFAB in Nairobi, and volunteers from various institutions have formed an OFAB Programming Committee that selects and schedules talks and activities that take place in the monthly meetings.

AATF thus enjoyed a very fulfilling and exciting year in 2006: it was a year marked by success on the technical level, as well as self-evaluation and rededication on the corporate level to the Foundation's vision and mission – especially to bringing technological solutions within reach of Sub-Saharan Africa's smallholder farmers.

Our work received recognition at the highest level when His Excellency Chief Olusegun Obasanjo, President of the Federal Republic of Nigeria, declared it '…an innovative institutional structure (that is a) major step forward (in enhancing) access to new crop technologies and seeds to small farmers…' in his opening remarks at the Summit on Food Security in Africa in Abuja, Nigeria on 7 December 2006. We are humbled by the President's statement and would like to assure him and all our stakeholders that we will stay true to our promise.

Dr Mpoko Bokanga
Executive Director

About AATF

The African Agricultural Technology Foundation is a not-for-profit organisation designed to facilitate and promote public/private partnerships for the access and delivery of appropriate proprietary agricultural technologies for use by resource-poor smallholder farmers in Sub-Saharan Africa. The Foundation is a one-stop shop that provides expertise and know-how to facilitate the identification, access, development, delivery and utilisation of proprietary agricultural technologies.

AATF works towards food security and poverty reduction in Sub-Saharan Africa, and its structure and operations draw upon the best practices and resources of both the public and private sectors. It also contributes to capacity building in Africa by engaging African institutions in the execution of tasks that contribute to the Foundation's mission.

AATF is a registered charity under the laws of England and Wales and has been given tax-exempt status in the USA. It is incorporated in Kenya and in the UK and has been granted host country status by the Government of Kenya where it is headquartered.

Vision – What We Want for Africa's Farmers

'Prosperous farmers and a food secure Africa, enabled through AATF's catalytic role in bringing innovative technologies to smallholder farmers.'

Mission – What We Do For Africa's Farmers

To access and deliver affordable agricultural technologies for sustainable use by smallholders, in particular resource-poor farmers, in Sub-Saharan Africa through innovative partnerships and effective technology/product stewardship along the entire food value chain.

Core Values – What Keeps Us Strong

We strive to uphold three enduring core values: Integrity, Dedication and Accessibility (IDA). These guide our decisions, actions and relationships as we work towards fulfilling our mission.

Our Strategy

Management of strategic partnerships, technology stewardship and information and knowledge management are key aspects to attaining our goals. We anchor our activities within three strategic thrusts:

When you see clouds gathering, prepare to catch rainwater.

Gola (Sierra Leone) Proverb

- Negotiating access to proprietary technologies that enhance the productivity of agriculture in Africa.
- Managing partnerships for project formulation, product development and deployment to introduce innovative agricultural technologies to African farming systems.
- Managing knowledge and information to support technology identification and development, and the policy environment.

Our Roots

The model for the African Agricultural Technology Foundation was a result of two years of consultations with several African, North American and European stakeholders by the Rockefeller Foundation and the Meridian Institute. The consultations, referred to as the 'Biotechnology Dialogues', were held to determine ways to close the growing gap between the agricultural science controlled by developed countries and the needs of the poor in the developing countries.

Stakeholder involvement was ensured through a Design Advisory Committee (DAC), comprising representatives from major stakeholder groups – African national agricultural research systems, Consultative Group on International Agricultural Research centres, African seed and biotech companies, Organisation for Economic Co-operation and Development, crop science corporations, and donor organisations. The DAC served as the architect of AATF, defining the major underlying principles and an operational model for the Foundation in addressing food security and poverty reduction challenges. It defined the core rationale for AATF, the fundamental principles, mission and business model.

Governance

AATF is a flexible organisation, designed to respond to the changing needs of its primary stakeholders. The Board of Trustees charts the course by deciding which interventions hold the greatest promise for reducing poverty and increasing food security while management has responsibility for implementation and operations. This creates a healthy separation between priority setting and monitoring on the one hand, and day-to-day management and operations on the other. The AATF Board members are distinguished individuals from around the world while the staff are nationals of countries in Sub-Saharan Africa.

Investors

- The United Kingdom's Department for International Development (DFID): The UK Government department responsible for promoting economic development and the reduction of poverty globally.
- The Rockefeller Foundation: A knowledge-based, global foundation with a commitment to enrich and sustain the lives and livelihoods of poor and excluded people throughout the world.
- The United States Agency for International Development (USAID): The agency responsible for providing and managing US economic and humanitarian assistance worldwide.

Partners

- Agricultural producers/consumers
- National and regional institutions/agencies (NARs, SROs, RECs, ECA, FARA, AU/NEPAD)
- International institutions/agencies (CGIAR, ARIs)
- Local/international NGOs
- Agricultural technology IP holders (Monsanto, Arcadia Biosciences, BASF, DowAgro, Pioneer/DuPont, Syngenta, Academia Sinica)
- African trade and agribusiness organisations
- African national governments
- International development investors (The Rockefeller Foundation, UK DFID, USAID)

AATF Publications 2006

AATF (African Agricultural Technology Foundation) 2006. *Harnessing the Potential of Public/Private Partnerships*. Annual Report 2005. Nairobi, Kenya: African Agricultural Technology Foundation.

AATF (African Agricultural Technology Foundation) 2006. *Empowering African farmers to eradicate Striga from maize croplands*. Nairobi, Kenya: African Agricultural Technology Foundation.

Kanampiu F, Omanya G, Muchiri N, Nang'ayo F, Werehire P, Tyrell D and Sthamer V (eds). *Launch of STRIGAWAY® (IR maize) technology for Striga control in Africa*. Proceedings of the launch of the STRIGAWAY® (IR maize) technology, 5–7 July 2005, Kisumu, Kenya. Nairobi, Kenya: African Agricultural Technology Foundation.

Facilitating the Adoption of Strigaway® Maize Technology by Smallholder Farmers

Challenges to Adoption and Use of New Technologies

In Africa, the adoption of improved agricultural technologies is low, averaging about 10% for improved crop seeds. There are many reasons for the slow uptake of new technologies, including the low incomes of the majority of African farmers; limited access to improved seeds; the high cost of chemical fertilisers; low awareness levels closely linked to inadequate extension services; the slow movement of improved genetic materials from public to private sector institutions; and farmers' reluctance to invest in new, more costly inputs without assurance of markets and returns.

In addition to this array of constraints, African farmers cultivate crops in a risky environment prone to erratic rainfall and drought, and, at the other extreme, floods occasionally devastate farmlands. Despite these challenges, African subsistence farmers continue to cultivate their staple crops. Maize is one of the most important of these staples, accounting for almost 40% of all cereal production, yet average yields are less than 1.5 tonnes per hectare, compared with more than 8 tonnes per hectare in industrialised countries.

The Contribution of Strigaway® Maize Technology

A key constraint to maize production among smallholder farmers is the parasitic weed, *Striga*, also known as 'witchweed'. It depresses maize grain yield by 20–100%, often leaving farmers with little or no food grain at harvest.

In western Kenya, this weed is present on an estimated 210,000 hectares of farmland cultivated with maize. Fortunately, research by the International Maize and Wheat Improvement Center (CIMMYT) and Weizmann Institute of Science in Israel, in collaboration with the Kenya Agricultural Research Institute (KARI) with funding from the Rockefeller Foundation, has yielded a promising technology, called Strigaway® maize, which comprises herbicide-resistant maize seed coated with Imazapyr herbicide.

The initial germplasm was obtained from BASF, a multinational producer and supplier of chemicals including the herbicide Imazapyr. Strigaway® maize imbibes Imazapyr on germination.

As the maize plant grows, its roots produce chemicals that stimulate the germination of nearby *Striga* seeds, which in turn produce a sucking tube (called a haustorium) that attaches to the roots of the maize plant and withdraws nutrients and water. Fortunately, the haustorium also transmits the Imazapyr herbicide, which is fatal to the *Striga* seedlings.

A baseline study conducted in 2005 indicates that *Striga* damage and control are significant determinants of the poverty status of households in western Kenya. Indeed, respondents involved in the baseline study ranked *Striga* infestation as the most important cause of food shortages in western Kenya.

Celestine Wekesa, an extension worker, checks the performance of Strigaway® maize on a farm in western Kenya

In 2005 and 2006, AATF facilitated an extensive on-farm demonstration and awareness programme among some 13,000 farmers in western Kenya. The field demonstrations were undertaken by the Western Regional Alliance for Technology Evaluation (WeRATE), a consortium of twelve NGOs and six farmer organisations, and backstopped by the Kenya Agricultural Research Institute (KARI), the Tropical Soil Biology and Fertility Institute of CIAT (TSBF-CIAT) and Maseno and Moi universities under the coordination of AATF.

Over 11,000kg of Strigaway® maize hybrid seed, known by farmers in Kenya as *Ua Kayongo* (Kill *Striga*), were distributed to NGOs, research organisations, farmer organisations, Western Seed Company and the Ministry of Agriculture. The seed resulted in the establishment of over 13,000 on-farm demonstration plots. In addition to the important lessons learned by farmers, these field demonstration plots produced about 505 tonnes of maize (worth US$ 105,000 at the prevailing market price). Some impressions of farmers on *Striga* and Strigaway® maize are presented on the next page.

The results of the on-farm work show Strigaway® maize technology to be very promising, with an average doubling of maize yields (to 3,000kg/ha) and near total inhibition of *Striga* seedlings. The programme not only demonstrated the potential of the new technology, but also actually opened up some previously abandoned *Striga*-infested farmland. This represents a big step towards better food security and livelihoods for smallholder maize farmers.

Commercial Release of Strigaway® Maize Technology in Kenya

In December 2006, Strigaway® maize technology was commercially launched in Kisumu, western Kenya. Following the launch, the Western Seed Company, based at Kitale, produced about 60,000kg of certified Strigaway® maize seed that is expected to be available from input stockists in 2007. Thus, 2007 will mark the first year of commercial availability of Strigaway® maize in Kenya following the on-farm demonstration programme.

However, the amount of seed available still falls below the amount needed for all farm households inhabiting *Striga*-infested areas. Nevertheless, it is a bold beginning towards addressing the *Striga* problem and it is hoped that certified seed production will increase sufficiently to cope with rising demand.

To foster sustained use of the technology, AATF will continue to monitor the utilisation and performance of Strigaway® maize among farmers in western Kenya. In addition, AATF and its partners will continue to assess compliance among farmers and stockists to product user instructions, facilitate training workshops for farmers and stockists, and obtain vital feedback from farmers using the new technology.

Lessons learned from the deployment of Strigaway® maize in Kenya are informing the strategy being developed to introduce this technology in other African countries ravaged by witchweed.

Farmers' impressions of *Striga* and IR maize as a control measure in Kenya

Rose Katete, Teso. *'I pulled and buried* Striga *on my five-acre farm for the past 17 years and the problem only grew worse. During a farmer field day we learned about herbicide-treated seeds and I was one of the first farmers in the community to receive the new IR maize seed. It has provided the best crop of maize that I have ever grown!'*

Teresa Lubusi, Vihiga. *'I stopped growing maize over the past three years because of poor yields resulting from* Striga *infestation. During that period, I would harvest only 60kg of maize from my 1.5 acre plot and my family endured severe food shortages. Since the introduction of IR maize, I now produce enough maize to feed my family. I harvested 135kg of maize from only one kg of seed planted on 0.1 acre. My neighbours were very curious about the sudden improvement in my farm and I encouraged them to plant IR maize too.'*

John Kundu, Bungoma. *'An extension officer visited my farm in 2004 and was shocked by the* Striga *damage to my maize. Since then many more came to witness it. That was before I planted IR maize to fight* Striga*. Now, I invite the same farmers to see the improvement. Everyone wants to buy IR maize now and it must become more available in the market soon.'*

Top to bottom:
Rose Katete
Teresa Lubusi
John Kundu

He who does not cultivate his field will die of hunger.

Guinea Proverb

Striga Management in Maize Fields in Sub-Saharan Africa

Striga currently infests about 2.4 million hectares of Sub-Saharan Africa's maize cropland, causing massive yield losses estimated at 1.6 million tonnes per year valued at over US$ 380 million. This indigenous parasitic weed co-evolved over many centuries in the region's savannas and dry woodlands along with various native grasses and small grains, which served to keep *Striga* in check. But with the clearing of land for agriculture and the introduction and rapid spread of non-native and highly susceptible cereal crops – especially maize – the weed was able to colonise vast areas of cultivated cropland. The question now is 'how best can this constraint to agricultural productivity be brought under control'?

New Options for Resource-poor Farmers

Recently, an exciting new approach to *Striga* management in maize fields has been developed and field tested, one that allows farmers to grow maize and kill *Striga* at the same time. Resistance to a chemical herbicide called Imazapyr, which is very effective against *Striga*, was bred into African maize varieties over a 12-year period by the International Maize and Wheat Improvement Center (CIMMYT) and the International Institute of Tropical Agriculture (IITA), in collaboration with several African national agricultural research organisations. At its earliest stage of technical development, the herbicide was sprayed on maize fields in the conventional manner. Later, however, the Weizmann Institute of Science in Israel, in collaboration with CIMMYT, demonstrated the effectiveness of applying the herbicide to seed. Imazapyr is manufactured by BASF, a multinational corporation and is marketed under the trade name Strigaway®.

During 2005 and 2006, Imazapyr-resistant (IR) maize was field tested on over 13,000 farms in western Kenya. In addition, the effectiveness of several different *Striga* management practices – including *Striga*-resistant varieties (e.g. KSTP94 from the Kenya Agricultural Research Institute, KARI), the 'push-pull' system developed by the International Center for Insect Physiology and Ecology (ICIPE), soil fertility management options developed by the Tropical Soil Biology and Fertility Institute of CIAT (TSBF–CIAT) and by the Western Region Alliance for Technology Evaluation (WeRATE, a consortium of Kenyan NGOs) – have been monitored on 120 farms over four consecutive growing seasons.

Ua Kayongo resulted in the greatest maize yield (2.60 tonnes of grain per hectare), the largest net returns (US$ 371 per season), and the least *Striga* expression (0.5 *Striga* stems per plant). In contrast, the *Striga*-susceptible hybrid (H513) produced 1.58 tonnes of grain per hectare, net returns of US$ 228 per season and was infested by 2.6 *Striga* stems per plant. The other *Striga* management options were less effective, producing on average 2.29 tonnes of grain per hectare, and were infested by 0.9 *Striga* stems per plant. Clearly, Imazapyr

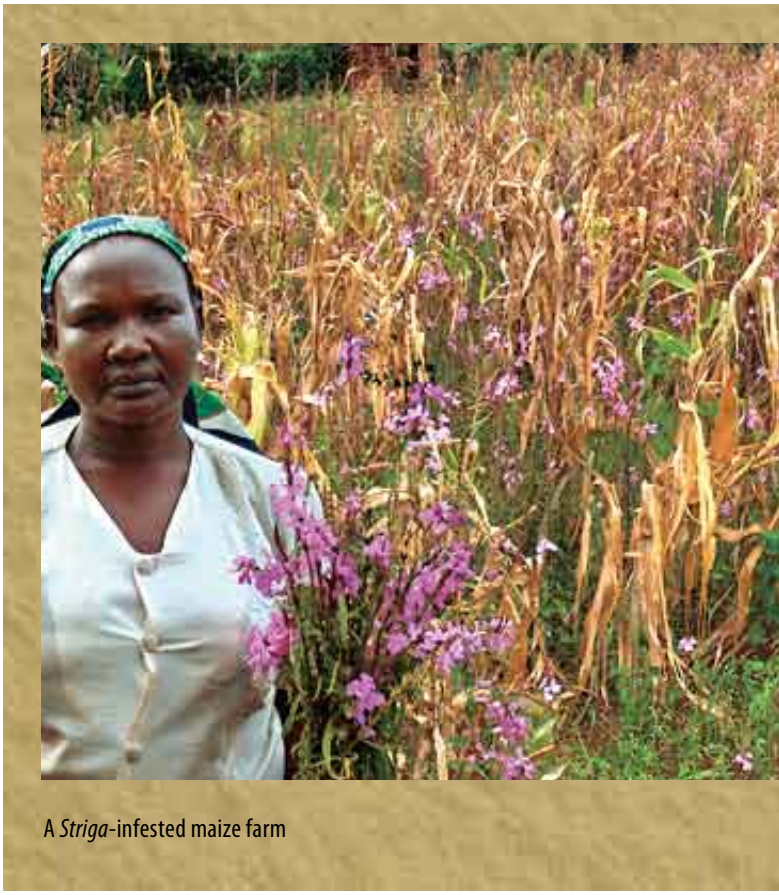
seed treatment is a breakthrough technology in *Striga* control, but its benefits are likely to be enhanced by its combination with other management approaches, particularly suppression of *Striga* by field legumes and roguing of surviving *Striga* plants before they flower. Efforts are now under way to commercialise Strigaway® maize in Kenya (see p 8).

Unfortunately, the efficacy of new technologies alone does not ensure their use by resource-poor African farmers. Adoption also depends on the availability to farmers of products that embody the technology, the applicability and appeal of the technology in new locations that share similar constraints (scalability), and the ability of the technology to achieve sufficient 'momentum', such that its use persists in the absence of external support mechanisms (sustainability). Moreover, effective *Striga* management also requires that farmers understand the weed's lifecycle and apply proven field sanitation practices that prevent proliferation of its seed in the soil.

Strigaway® maize performs best when combined with other knowledge-based approaches to suppressing *Striga*, particularly the use of certain legumes that trick the weed into germinating without a viable host available to sustain it (this is known as 'suicidal germination'). For this reason, innovations in Strigaway® maize-legume intercropping have an important role to play in *Striga* reduction, in effect attacking the parasite on two fronts. Intercropping permits the cultivation of a range of pulses – particularly groundnut and soybean – that both help control *Striga* and provide income to farmers. Combining Strigaway® maize with Desmodium in the proven 'push-pull' system provides farmers with more effective *Striga* control, as well as more and better livestock feed. Thus the effective management of *Striga* can be linked to larger development goals by encouraging the diversification of farm enterprises in response to new market opportunities.

The Need for Cooperative Action

Striga management in maize fields will require collective action. Care must be taken to prevent the spread of seed into new fields or its reintroduction into already infested fields. Erecting soil conservation structures that limit the flow of runoff from infested fields, restricting the movement of livestock between infested and non-infested farms, and aggressively controlling new outbreaks are examples of necessary collective measures aimed at *Striga* management. In addition, community-based initiatives to monitor *Striga* reduction on affected farms and certify its control will be needed, as well as effective incentives designed to engage all affected farm households in collective *Striga* management activities.



A *Striga*-infested maize farm

Striga Under Control in Africa

Empowering *Striga*'s victims today is a first step towards a brighter future for resource-poor African farmers. Maize fields freed from the weed's grip will yield marketable maize surpluses, contributing to household food security and poverty reduction. Depending on market conditions, some of this now more productive land could also be planted to higher value crops, such as sugarcane, upland rice and finger millet. The same community-based farmer associations that lead the *Striga* control effort could collectively market surplus production, generating revenue for sustaining their work and securing higher prices for member farmers.

Such is the potential power of new technologies and initiatives aimed at managing *Striga* in Sub-Saharan Africa. The realisation of this power requires the collective strength and wisdom of such public/private partnerships as the one involving BASF, CIMMYT, the Weizmann Institute, AATF, and a growing number of NGOs and community-based organisations.

Major Hurdles Overcome:

Essential Steps in Developing *Bt* Cowpea for Africa are Achieved

Cowpea is one of the most important food grain legumes in the tropics. World annual production is estimated at 7.6 million tonnes, produced on about 12.8 million hectares (64% of which is in Africa). Over 75% of the area under cowpea in Africa is in west Africa making it the region with the largest production and consumption of cowpea in the world.

A serious problem for cowpea production is its susceptibility to attack by pests and diseases. Cowpea in Africa is attacked by a range of very damaging insect pests, both in the field as well as during grain storage after harvest. Insect damage losses as high as 80% of total crop production every year have been documented. Several insect species attack cowpea in the field. These include the legume pod borer, *Maruca vitrata*, commonly called the cowpea pod borer, which is considered to be one of the most destructive cowpea pests. The low cowpea yields reported for much of Sub-Saharan Africa are due primarily to the absence of appropriate insect control technology.

Host plant resistance has proved to be very limited in cowpea germplasm. IITA holds the largest cowpea germplasm collection in the world. Extensive screening for resistance to cowpea pod borer has not yielded any useful levels of resistance. Therefore, progress in the improvement of *Maruca*-resistant cowpea has been limited. On the other hand, *Maruca vitrata* being a lepidopteran insect, showed high susceptibility to one of the *Bt* crystal proteins, leading to the need to use new tools, such as genetic engineering, to introduce resistance genes into the cowpea genome.

In 2005, AATF signed a royalty-free agreement with the Monsanto Company to access the protein sequence of the *Bt* gene, as well as to access regulatory, safety and other information regarding the use of the gene in food plants.

The prerequisites for developing a transgenic crop include effective and efficient transformation and regeneration systems. These two prerequisites were achieved in 2006, and subsequently published in a scientific

Only when you have crossed the river can you say the crocodile has a lump on his snout.

African Proverb

journal (see Popelka et al, 2006. *Plant Cell Reports* 25, 304–312).

Significant milestones in developing insect-resistant cowpea germplasm were achieved, thus paving the way to introduce genes into the cowpea genome. Using the transformation system described below, cowpea lines expressing the *Bt* gene were obtained.

This *Bt* protein has been synthesised, reconstructed and moved into a binary vector for use in genetic transformations. In 2006, the gene was successfully transferred into the cowpea genome. It has been expressed in young vegetative organs, and has proven effective against the caterpillar pest, *Helicoverpa armigera*, an insect that, like *Maruca vitrata*, belongs to the lepidopteran family.

Proof-of-Concept

Two hurdles were overcome in 2006. These were the validation of and decision to use *npt*II as a viable alternative selectable marker to bar and the expression at sufficiently high levels of a *Bt* gene in the organs of cowpea that are targeted by pod borers. *Npt*II gene is widely used in approved products already on the market. It is even one of the only two antibiotic resistance genes accepted by the European Food Safety Authority (EFSA) as posing no significant risk to human or animal health or to the environment.

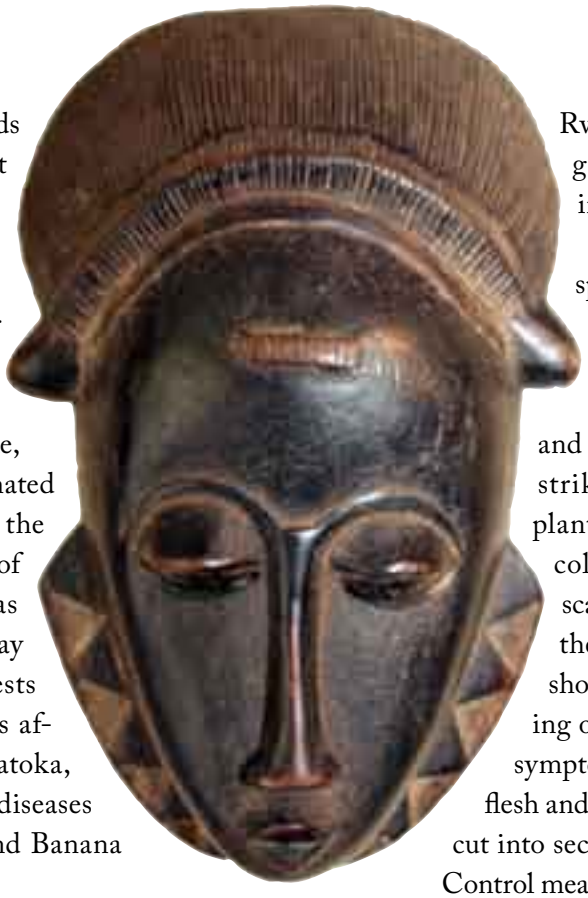
We now have an improved transformation system using antibiotic as a chemical selection agent. We have obtained transgenic cowpea plants expressing a *Bt* gene in the organs that are vulnerable to pod borer damage. The proof-of-concept that *Bt* cowpeas can be protected against an important lepidopteran pest was demonstrated by using the caterpillar pest, *Helicoverpa armigera*. This pest inhabits tropical and sub-tropical regions and is extremely damaging to legumes and other crops. The successful resistance of the transgenic cowpea to this insect therefore holds the promise that it may also be resistant to the legume pod borer, *Maruca vitrata*. Thus, the next step in this process will be to test the resistance of *Bt* cowpea against *Maruca* pod borer.

To facilitate transfer of the *Bt* gene into elite African cowpea varieties, a plant breeder from Nigeria's National Agricultural Research Institution will spend three months in 2007 in the CSIRO Plant Industry laboratory learning the cowpea transformation techniques, *Bt* gene tracking in offspring lines and introgression of the *Bt* gene into advanced breeding lines.

More than 10,000 'explants' (the starting plant tissue used for genetic transformation) have been transformed with the *Bt* gene. The transformation system has an efficiency rate of 0.1% to 0.3% and is still improving, while regeneration system allows a survival rate of about 80%. Twenty-four independent transgenic lines have been obtained and five of them have already progressed to the first generation stage. These five lines are now growing in the glasshouse and PCR analysis shows that four of these are transmitting the *Bt* transgene to the next generation. The *Bt* gene is active in the remaining four lines and the protein can be easily detected using ELISA and Western Blot techniques.

Top: Cowpea
Bottom: *Helicoverpa armigera*

Joining the War to Combat the Banana Bacterial Wilt Epidemic in Africa's Great Lakes Region



In the east African highlands and most of the Great Lakes region, bananas are a major staple food and source of income for an estimated 50 million smallholder farmers and their families. In such countries as Uganda, Burundi and Rwanda for example, per capita consumption is estimated at 450kg per year, the highest in the world. Despite the importance of the crop, cultivation of bananas in the Great Lakes region today faces major challenges from pests and diseases. The major diseases afflicting the crop are Black Sigatoka, Fusarium Wilt, and such viral diseases as Banana Bunchy-top Virus and Banana Streak Virus.

In 2001, an outbreak of yet another disease, banana bacterial wilt (caused by *Xanthomonas campestris* pv *musacearum*) occurred in Uganda. This disease was previously restricted to Ethiopia, but is now rapidly spreading to many areas in the Great Lakes region. The disease leaves in its wake a trail of crop destruction and utter misery among affected farms. 'Those diseases which affected our bananas historically … only reduced the yield, but they would never kill off bananas altogether,' says Dr Wilberforce Tushemereirwe of Uganda's National Agricultural Research Organization (NARO). In the five years since the first outbreak of bacterial wilt was diagnosed in Uganda, the disease has spread to 33 districts in the country and beyond into the Eastern Democratic Republic of Congo, Kenya, Tanzania and Rwanda. It thus threatens to engulf all banana-producing areas in Africa.

Banana bacterial wilt (BBW) is spread through the use of infected banana planting materials (the suckers); infected cutting tools; and by such vectors as bees and browsing animals. When BBW strikes, the leaves of the infected plants initially exhibit a dull green colour that gradually assumes a scalded appearance, culminating in the wilting of the plant as bunches show uneven and premature ripening of fruit. The diseased fruit shows symptomatic yellowish blotches in the flesh and dark brown placental scars when cut into sections.

Control measures designed around farm sanitation have been recommended. These include the early removal of male flower buds, disinfecting farm tools, and destruction of affected banana stems in a bid to reduce the disease inoculum. In addition, plant quarantine authorities in the region strictly forbid the movement of banana plant material from infected areas. However, these interventions can at best only delay the spread of the disease.

It is against this background that NARO and the International Institute of Tropical Agriculture (IITA) sought to access candidate genes for conferring resistance against BBW. One such gene was the plant ferrodoxin-like protein (*pflp*) gene from sweet pepper. The gene is owned by Academia Sinica, a public sector institution in Taiwan that AATF first approached in

2005 to negotiate access to *pflp* for use in transformation to produce banana varieties resistant to BBW. This gene has already been used successfully to combat diseases in such crops as tobacco, potato, tomato, broccoli, orchids and rice. AATF successfully concluded negotiations for a royalty-free license agreement with Academia Sinica in August 2006. The agreement granted AATF access to and use of Academia Sinica's *pflp* gene to develop and commercialise banana varieties in Sub-Saharan Africa that are resistant to BBW.

This important agreement gave added impetus to the genetic transformation of bananas, work that started in 2005 and has now proceeded through to the proof-of-concept stage. Preliminary laboratory bioassays indicate that transgenic banana plants appear to be resistant to BBW, in contrast to their untransformed counterparts which exhibit leaf necrosis and wilting when challenged by an inoculum of spores from *Xanthomonas campestris* pv *musacearum*.

AATF then moved on to constitute a partnership of institutions in an initiative for developing, testing and deployment of genetically engineered banana varieties with resistance to BBW. Once developed, these varieties will be central to an integrated control strategy useful for smallholder banana farmers.

AATF commissioned a feasibility study to assess the viability and cost of such an ambitious effort. Based on this study, it was estimated that the initiative will require at least five years to develop GM banana technology that is resistant to BBW, and another three years to set up commercial production of suckers for distribution to farmers.

In December 2006, AATF granted a sublicense to IITA to use the *pflp* gene in its transformation research. In addition, and at the request of AATF, the Public Interest Intellectual Property Advisors (PIIPA) arranged for the Intellectual Property and Business Formation Legal Clinic of the University of Missouri Law School to conduct a comprehensive Freedom-to-Operate (FTO) assessment for the project. AATF also commissioned an in-depth study to assess safety considerations associated with the development and deployment of transgenic bananas in Africa.

The initiative to genetically modify bananas – with the eventual goal of producing food containing novel genes – must take into account a range of social, economic and political considerations associated with GM technology. Noting that the development of transgenic bananas is a long-term process that could take up to a decade to bear fruit, it is imperative that interim interventions be formulated to run parallel to the transformation initiative. Such short-term control measures should be targeted at halting the spread of the disease and contributing to conserving the highland banana germplasm from the serious threat posed by BBW. This can be accomplished through ensuring germplasm conservation and facilitating the availability of clean planting material to farmers in Sub-Saharan Africa. Indeed, once BBW-resistant banana varieties are obtained, they will require high-throughput tissue culture-based multiplication and distribution systems for BBW-resistant banana plantlets. Clearly, there is a compelling need to improve the efficiency and capacity of production of clean banana plantlets as an interim measure for replacing banana germplasm lost in the wake of the spread of banana bacterial wilt disease.

In view of this, AATF is formulating a sub-project for large-scale micro-propagation of banana plantlets through tissue culture, drawing expertise from local public and private sector institutions. This effort will endeavour to access the know-how and expertise of older and more advanced tissue culture industry such as the one found in Taiwan.

Product from tissue culture banana

Update on Product Concepts

Rice Varieties with Enhanced Nitrogen Use Efficiency and Salt Tolerance

The Constraints

For several years, the annual demand for rice in Africa has consistently outstripped local production. Annual rice production is estimated to be between 12 and 17 million tonnes, and its consumption is growing by 6% per annum. The result is a growing annual deficit in rice production, currently estimated to be about 6.5 million tonnes, valued at US$ 1.7 billion at today's prices. This deficit situation necessitates substantial rice imports and an equally substantial outflow of foreign exchange reserves from many African countries.

In most areas of Sub-Saharan Africa, rice yields are generally low, ranging between 1.0 to 2.8 tonnes per hectare. This is less than 30% of what could be produced if better adapted and higher yielding rice varieties were cultivated and properly managed. Several factors account for low yields in rice, but nitrogen deficiency has been cited as a leading constraint to upland rice production, while high salinity is increasingly becoming a major problem in rice growing areas of the coastal lowlands and mangrove swamps of Africa. These constraints are difficult to address with conventional germplasm and current farming practices. Fertilisers are expensive and unavailable, and salinity can hardly be controlled.

The Strategy

A technology for enhancing nitrogen use efficiency (NUE) in crops has been developed by Arcadia Biosciences, a biotechnology company based in Davis, California. The technology has already been licensed to Monsanto for use in canola. Arcadia Biosciences is interested in sharing this technology, royalty-free, with institutions developing products for smallholder farmers in Sub-Saharan Africa. AATF brought this to the attention of the Africa Rice Centre (also known as West Africa Rice Development Association, WARDA) who showed great interest.

AATF has been negotiating access to Arcadia technologies since January 2005, and in 2006 AATF and Arcadia signed Heads of Agreement for future license agreements. The first draft of a license agreement is under review by the parties, who are also currently

It is not what you are called, but what you answer to.

African Proverb

working on developing a business plan for the project. Arcadia Biosciences also owns a technology for improving salt tolerance in crops and is willing to share this technology with institutions in SSA through AATF.

The Africa Rice Centre will collaborate with AATF to produce rice varieties with greater NUE and salt tolerance using the technologies from Arcadia. AATF has obtained permission from Arcadia Biosciences to have access to their laboratories and business development expertise, and from the Africa Rice Centre to have access to their rice germplasm, breeding and variety testing capability.

Atoxigenic *Aspergillus Flavus* Strains for Aflatoxin Control in Peanuts

The Constraint

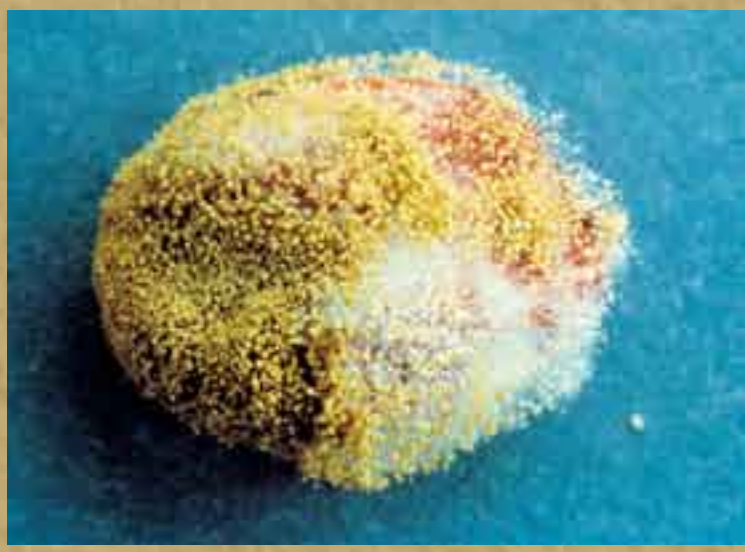
Peanuts are prone to aflatoxin contamination, which is caused by contamination with toxigenic strains of *Aspergillus flavus* and is mediated by several factors, including end-of-season drought, mechanical damage to pods during harvesting, and poor storage methods. The problem is so severe that in some cases, aflatoxin accumulation in peanut seeds has been found to reach 2,000 ppb, which is 100-fold greater than the regulatory limit set by the Codex Alimentarius Commission. Consumption of such contaminated peanuts and food products causes serious human health problems, including disease and, in extreme cases, death.

Apart from these health-related effects, aflatoxin contamination can have adverse economic effects such as the rejection of peanuts by importing countries. In fact, exports of agricultural commodities, particularly peanuts, from Sub-Saharan African countries have declined by as much as 20% over the past two decades owing to non-compliance with the European Union market regulations on mycotoxins.

The Strategy

A biological approach to controlling aflatoxin contamination is based on the microbial competitive exclusion principle. This strategy seeks to establish benign strains of *Aspergillus flavus* and *A. parasiticus* in soils where peanuts are planted to compete with and eliminate aflatoxin-producing strains. Developed by USDA–ARS, the technology – known as AflaGuard® – has been licensed to a private company, CircleOne Global, which has commercialised it in the USA and is now exploring potential markets in China, Latin America and Africa.

Top to bottom:
Peanuts are prone to aflatoxin contamination
Aspergillus flavus on a peanut
Nerica rice



It has been reported that the use of AflaGuard® on peanuts in the USA reduced aflatoxin contamination by up to 98%.

AATF has initiated negotiations with USDA–ARS and CircleOne Global for access to and subsequent adaptation of this technology for reducing aflatoxin contamination in peanuts in Sub-Saharan Africa. Bridgeworks (Kenya) Ltd, a private company, has been contacted by AATF to partner with CircleOne Global to determine suitable ways to exploit AflaGuard® for use in Africa. Discussions between CircleOne and Bridgeworks are ongoing. South Africa and Mozambique have also expressed interest in this technology.

Mechanical Equipment for Labour Productivity Improvement in Cassava Production and Utilisation

The Constraint

Africa is the world's largest cassava producing region and accounts for nearly 55% of the world's cassava output. Cassava is a major food security crop and has the potential to make a significant contribution towards poverty alleviation and economic growth. However, the current low yields, high cost of production, and low quality of cassava products stemming from inefficient processing methods severely limit the ability of this crop to deliver on its income generating potential.

The mechanisation of cassava production and processing operations has been identified by cassava experts as the most promising area for intervention and for realising the potential of this crop. Some of the largest cassava producing countries in Africa, such as Nigeria, Ghana and the Democratic Republic of Congo, have launched high-level initiatives to promote cassava industrialisation. However, these initiatives are constrained by the difficulty of accessing the technologies required for mechanising cassava production and processing operations.

The Strategy

In response to the above constraint, AATF is exploring opportunities of working with partners such as the United Nations Industrial Development Organisation (UNIDO) and the International Institute of Tropical Agriculture (IITA) to improve cassava productivity through approaches which optimise labour productivity in field and processing operations.

Building a Conceptual Framework for a Project on Industrialisation of Cassava in Africa

A meeting was held in Maputo, Mozambique in September 2006 that brought together strategic partners to set in motion the process of access, adaptation and transfer of technologies for the mechanisation of cassava production and processing from Brazil to Sub-Saharan Africa. Private sector companies in Brazil willing to share their technology attended the meeting and shared their experience and expectation with fabricators in Mozambique to pave the way for collaboration in manufacturing machinery and tools in Africa for cassava mechanisation.

Bracing for Genetically Modified Crops:

Status of Regulations for GM Crops in African Countries

The role of biotechnology in the economic transformation of developing countries, including those in Africa, has become a subject of intense academic inquiry and public policy discourse. This debate tends to be polarised at two extremes: one that perceives biotechnology as a source of solutions to many economic, social and environmental problems, including those prevalent in developing countries; and at the other extreme, GM technology is regarded with considerable suspicion, resulting in GMOs and food derived from them being rejected. Yet after serious assessments and reflections, various academic and scientific committees have concluded that GM crops do not harbour greater risks than their conventional counterparts.

However, one issue that is germane both to proponents of GM and those opposing modern biotechnology is the need for regulation. The pertinent issue is how to sufficiently regulate GM technology to optimise benefits while safeguarding against risks. The importance of regulating modern biotechnology is noted in the text of the Convention on Biological Diversity (CBD). The CBD recognises the potential of new biotechnologies in promoting the wellbeing of people, particularly in meeting the critical need to improve agricultural productivity, food security, and health care. The CBD also emphasises the need to ensure development of appropriate procedures to enhance the safety of biotechnology by minimising potential threats to biological diversity while taking into account risks to human health. Article 8(g) of the Convention obligates contracting parties to develop national biosafety systems. This is further emphasised in Article 19(3), which provides that 'The Parties to the Convention shall consider the need for and modalities of a protocol setting out appropriate procedures … in the field of safe transfer, handling and use of living modified organisms resulting from biotechnology that may have adverse effect on conservation and sustainable use of biological diversity,' effectively setting in motion processes and negotiations that gave rise to the Cartagena Protocol on Biosafety.

All African countries except Somalia have signed and ratified the Convention on Biological Diversity. A high number of countries (39 as of December 2006) have also ratified the Cartagena Protocol, meaning that they have agreed on 'taking necessary and appropriate legal, administrative and other measures to implement the Protocol's obligations … to ensure that the development, handling, transport, use, transfer and release of any living modified organisms are undertaken in a manner that prevents or reduces the risks to biological diversity, taking also into account risks to human health'. Put simply, this means agreeing to develop functional National Biosafety Frameworks (NBFs) to oversee the development and utilisation of GM products. Experience with protocols and the processes involved in develop-

ing functional NBFs indicates considerable variability from one country to the next, and this task often takes several years to fully achieve. There is also considerable variability among the components that constitute NBFs, but typically they have the following elements:

- Accepted national policies on biotechnology and biosafety;
- An approved regulatory regime for biosafety (such as law(s), decrees, regulations and guidelines);
- A system for handling notifications/applications for research and development permits; and
- Mechanisms for public information and public participation.

Using these elements as a guide, AATF undertook to assess the status of NBFs in African countries to determine their level of readiness for handling GM crops and products. The involvement of AATF in this area is considered strategic given the extreme divergence in perceptions of GM technology, which sends confusing signals to observers in many African countries and in the donor community. The result was identification by AATF of those countries that have developed NBFs sufficiently to allow application of modern biotechnology to agriculture and those countries that require additional support, capacity and time. AATF's efforts to monitor the evolution of regulatory frameworks in African countries is expected to guide the targeting of R&D efforts on GM crops to areas where their benefits can be better harnessed, while their risks, if any, are minimised.

Smooth seas do not make skilful sailors.

African Proverb

Product Stewardship:

Promoting the Responsible and Sustainable Use of New Agricultural Technologies

The probability that the development, testing and use of agricultural technologies will be successful is strengthened if the partners involved in such initiatives embrace a comprehensive product stewardship programme. AATF partners with organisations and interest groups operating along the entire food value chain, including: technology providers; research and development institutions; private enterprises such as seed companies; NGOs, and CBOs; farmers; and consumers. Each of these groups has distinct interests and aspirations. For AATF and its partners, product stewardship is a process that identifies and minimises risks at every stage of the product life cycle and promotes long-term product utilisation. It comprises a mode of operation that lessens potential negative impacts on customers, the general public and the environment – today and in the future. Good product stewardship thus contributes to the sustainable use of products and demonstrates responsibility on the part of all partners involved in all the aspects of product development and deployment.

Why is Stewardship Important?

Safety is a societal requirement of operating a business; it is legislated through rules and regulations. The term 'regulation' is used in everyday life to mean (i) *the act of controlling or directing according to rule*, or (ii) *the state of being controlled or governed*. The emphasis is on *the sense of control in accordance with certain rule(s)* that is expressly implied in this definition. A more closely related term is 'compliance', which simply means *acting according to certain accepted standards*. The two terms are like two sides of the same coin: compliance cannot exist where there are no regulations, and if regulations are not abided by, they may as well not exist.

By embracing the principles of product stewardship, AATF and its partners obligate themselves to deliver products that add value to agriculture and are safe to consumers and the environment. For AATF, product stewardship is 'our license to operate' in a society, and we must, therefore, comply with the regulations of the countries in which we operate.

Ensuring Product Stewardship

By embracing stewardship, AATF and its partners collectively agree to place a high premium on the respect for intellectual property (IP) rights of others and on complying with all relevant licensing conditions, quality standards, procedural guidelines and regulatory requirements. In this regard, AATF embraces an IP policy that sets forth general principles to guide its position and expectations regarding the ownership, protection and use of IP contributed to, and resulting from, work undertaken pursuant to projects funded, sponsored or coordinated by the Foundation.

Product stewardship is also achieved by adopting appropriate scientific and technical safeguards for all products, and by advising stakeholders, including smallholder farmers, on the appropriate deployment or use of technologies and products.

Farmers listen attentively during a training workshop on Strigaway® maize held in Kisumu, Kenya

A good example of product stewardship is the development and delivery by AATF and its partners [CIMMYT, BASF, and the Kenya Agricultural Research Institute (KARI)] of a new technology, Strigaway® maize, to Kenyan maize farmers for the control of *Striga* in maize fields (see pp 7-11).

Throughout the development and delivery of this technology, AATF and its partners followed rigorous due process for variety testing and selection, culminating in the release of Strigaway® maize in Kenya. This was accompanied by training sessions for participating NGOs, farmer associations, and seed stockists, the provision of clear end-user instructions, and general information dissemination through easy to use booklets on a range of issues, including seed handling, transportation, storage, planting, and the need to maintain surveillance for late-emerging *Striga* weeds that could herald the onset of resistance. AATF will follow the same due process as it moves this technology into other *Striga*-infested countries in Sub-Saharan Africa.

In another project initiative, AATF and partners are involved in the development of insect-resistant cowpea using new tools revolving around genetic engineering. AATF obtained the right from Monsanto to use the *cry1Ab* gene for developing and commercialising (in Sub-Saharan Africa) insect-resistant cowpea varieties (*Bt* cowpea) on a royalty-free basis. In line with good product stewardship, AATF and partners will ensure compliance with mechanisms and regulations for deploying the crop in ways that mitigate insect resistance through appropriate insect-resistance management plans adapted around the *refugia* strategy. As a matter of course, there will be regular post-release monitoring of the integrity of *Bt* cowpea varieties, and training of farmers and extension workers in the identification of *Maruca* sensitivity and possible resistance to *Bt* cowpea under field conditions. This partnership is exploring the possibility of stacking insect resistance genes into cowpea as a way of mitigating against build of resistance by *Maruca*.

Ensuring Freedom to Operate

Consistent with its mission to access and deliver affordable agricultural technologies for sustainable use by smallholders, and in particular resource-poor farmers, in Sub-Saharan Africa, AATF ensures that beneficiaries are able to access and use products developed in its projects. This is done by making certain that such products are developed and used in ways that do not infringe the contractual, intellectual property (IP) or other proprietary rights of third parties, or contravene regulatory requirements of countries in which they are deployed. To accomplish this objective, freedom-to-operate (FTO) assessments are conducted and, when necessary, permission is sought and obtained – either by license or letter of non-assertion – to use technologies that are IP-protected.

Why is FTO Important?

The aim of an FTO assessment is to determine whether a new product can be developed and/or commercialised without infringing existing IP rights, particularly patents. The assessment is usually done before the product is developed in order to adapt its characteristics to take into account third party patents. The assessment typically consists of a patent infringement search and opinion. The infringement search involves searching relevant databases to determine if there are patents in force that can potentially be infringed by developing and/or using a proposed product. Depending on the designated location for product development and/or use, the databases of the United States Patent and Trademarks Office (USPTO), the African Regional Intellectual Property Organization (ARIPO)[1], the Organisation Africaine de la Propriété Intellectuelle (OAPI)[2] and selected offices, such as the South African patent office, are searched. The infringement opinion is a determination by a qualified patent attor-

1. ARIPO currently has 16 member states: Botswana, the Gambia, Ghana, Kenya, Lesotho, Malawi, Mozambique, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe. Applicants can file their applications either with their national offices or directly with the ARIPO office. Under this system, one application is effective in all member states designated in the application.

2. OAPI is the central registration system for 16 French-speaking African countries: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, Guinea, Guinea Bissau, Mali, Mauritania, Niger, Senegal, and Togo. Under the OAPI system, the IP rights of an applicant are simultaneously protected in all member states through a single deposit, which is considered as a national deposit for each member state.

Move your neck according to the music.

Oromo (Ethiopia) Proverb

ney as to whether or not the development or use of a proposed product falls within the scope of the 'in force' patent(s) identified in the search. Once an FTO assessment has been concluded, AATF approaches third parties whose IP rights are affected and obtains their permission to use their IP-protected technologies.

In 2006, to ensure that AATF-developed products are free from restraints, the Foundation coordinated several FTO assessments and finalised a number of technology license agreements in the context of the following projects.

Africa Bio-fortified Sorghum

In January 2006, AATF conducted an inventory of all IP and other technologies being used in the Africa Bio-fortified Sorghum project. The Foundation then arranged for Adams and Adams, a reputable IP firm in South Africa, to conduct an FTO assessment for this project later in the year.

Banana Bacterial Wilt

In August 2006, Academia Sinica and AATF signed a royalty-free licensing agreement for access to and use of Academia Sinica's *pflp* gene to develop and commercialise banana varieties resistant to banana bacterial wilt in Sub-Saharan Africa. In December, the Foundation granted a sublicense to IITA to allow for banana transformation work to be carried out using the *pflp* gene. Also, at the request of AATF, the Public Interest Intellectual Property Advisors (PIIPA) arranged for the Intellectual Property and Business Formation Legal Clinic of the University of Missouri Law School to conduct a comprehensive FTO assessment for this project.

Nitrogen Use and Salt Tolerance Project

In October 2006, AATF and Arcadia Biosciences signed Heads of Agreement to provide for future license agreements for accessing and using the nitrogen use efficiency and salt tolerance genes developed by Arcadia Biosciences. A draft license agreement was subsequently prepared and is under review by AATF, Arcadia and the Africa Rice Center (WARDA). In December 2006, AATF commenced negotiations with the Public Intellectual Property Resource for Agriculture (PIPRA) for access to a plant transformation vector with a transposon module (which allows out-segregation of the selectable marker cassette in the transgenic offspring), owned by PIPRA member institutions, to be used in this project. An FTO assessment is planned for 2007 once all the genes and other relevant technologies are disclosed by Arcadia Biosciences and PIPRA.

Gluing Public/Private Partnerships:

Questions of Who and Why

The AATF mandate is to obtain access to appropriate proprietary technologies held by public and private sector organisations, and to facilitate good stewardship of those technologies as they are transformed into useful products that are ultimately deployed to smallholder farmers in Sub-Saharan Africa. The Foundation's primary means of fulfilling its mandate is through public/private partnerships and so the development and effective management of such partnerships is a critical function for AATF.

The Foundation takes a proactive approach in facilitating the creation of partnerships that strive to unite a wide variety of public and private sector organisations around shared agricultural research and development goals for the 'public good'.

Experience gained by AATF during its first three years of operation suggests that there is much more that goes into successful partnerships than the organisational arrangements made to facilitate such collaborations. Partnerships are themselves independent entities, each with their own identities, yet each reflecting the diverse organisational values and cultures of the individual partners. In order to effectively manage such partnerships, the strengths and weaknesses of each partner must be managed for the good of the whole. Closely aligned to this is the need to understand why partnerships are formed and what, besides the legal and contractual agreements, keeps them going – the 'glue' to the partnership. This requires looking beyond the immediate reasons for forming the partnership and understanding why each partner chooses to be involved.

Triggers to Partnerships

Public/private partnerships are usually triggered by societal or public needs. Different organisations and entities come together to pool their resources around those needs. However, it is also becoming evident that such partnership arrangements may be driven by incentives beyond the immediate common needs. The incentives may relate to the potential commercial and/or institutional benefits that may accrue to partners as a result of being a part of such initiatives. The extent to which such perceived potential benefits may be realised is, at least in part, a function of the dynamic

As the dog said, 'If I fall down for you and you fall down for me, it is playing'.

Ashanti (Ghana) Proverb

A single bracelet does not jingle.

Congo Proverb

realignment of each partner's role and responsibilities within the life of a partnership at different stages of its development. This realisation will often depend on the ability of partners to realign their own institutional identities, goals and objectives in ways that support the formation of the partnership and contribute to its success over time.

The Who and Why in a Partnership

Effective management of such partnerships requires the explicit recognition of why each partner is, or wants to be, involved. In other words, while having the right partners is important, they must be involved for the right reasons. In deciding which organisations or groups should be encouraged to join forces in a public/private partnership, there are really only two factors to consider: they either have the needed strengths or they don't, and they are either willing to participate or they are not.

If the 'right' organisations and groups exist, they are invited to join the initiative and the necessary agreements are entered into by the parties, agreements that clearly define relative roles and responsibilities. If the 'right' organisations do not exist, then the requisite gap analysis is done and strategies are formulated to address the gap(s). However, the question of why particular organisations are or want to be involved can take longer to address. The success of a given partnership rests on the contributions of those involved towards mutually agreed goals and objectives. A well-designed partnership provides for the monitoring of progress against agreed work plans, deliverables and timelines. But in the end, it is the people involved in a partnership and the spirit with which they deliver on their commitments that determines the strength of the partnership and the sustainability of its work. To capitalise on this spirit, it is important to understand the partners' special interests in the initiative – what it is that motivates each partner's involvement.

For some, such partnerships are largely an end in themselves. For others they are primarily a means to other ends. In either case, understanding what motivates participation is critical to the effective management of the partnership. Clearly, there can be a multiplicity of motivations. Is it the opportunity to associate with the other participants? Is it good public relations? Is partici-

pation seen as a corporate social responsibility? Is it an opportunity to open up new markets? Is it realignment of interests? Is it capacity building? What is important to understand is that the success of a partnership is not contingent on all partners behaving as one, but rather to recognise that different partners have different reasons for being involved, and that these interests and needs must be served by the partnership arrangements.

While some of these interests may be viewed as self-serving and outside the focus of the partnership, it is important to recognise that such differences can add strength to the partnership and help to ensure that the commitments made by partners are fulfilled. Indeed, for a partnership to be sustainable and effective, those involved must accept that the self-interest of the partners does not necessarily diminish the credibility of the partnership and its overall goals and objectives.

Flexibility is Key

In striving to identify the elements that influence the success of a partnership, it is essential to recognise the importance of flexibility in establishing and managing the initiative. In this context, flexibility implies the ability to establish a partnership using relatively informal mechanisms, or building flexibility into more formal contractual agreements. AATF has found that flexible contractual arrangements among the principal partners tend to produce better results due to the high level of commitment required to enter into such agreements. Still, as the work of a partnership progresses, principal or secondary players often emerge at different stages, and this requires sensitive management so as not to lose momentum towards the initially agreed goals and objectives.

Finally, it is important for partnerships to revolve around a leadership axis that is capable of holding the various elements together. However, those who lead in establishing a given partnership may, for a variety of reasons, not be the appropriate leaders to see it through to its conclusion. Successful partnerships in fact often see such changes in leadership. It is the mark of a healthy and sustainable public/private initiative, and reflects a heart-felt willingness on the part of the partners to put the success of the partnership ahead of their own institutional goals and desires.

Two men in a burning house must not stop to argue.

Ashanti (Ghana) Proverb

Science, Technology and Agriculture in Africa:

Sharing Information and Knowledge – The Open Forum on Agricultural Biotechnology in Africa

At the turn of this century, biotechnology emerged as a powerful tool that is contributing to increased agricultural productivity in many countries. Since 1996, biotechnology-derived crops have been commercially planted and their adoption has been increasing steadily; they are now planted by over 8.5 million farmers in 21 countries and cover over 90 million hectares (ISAAA 2006). Eleven countries growing these crops are from the developing world, for example Brazil.

The intense debate over agricultural biotechnology and its application focuses mainly on perceived risks and questions related to value, safety and impact (agronomic, economic and environmental). The last ten years have seen many of these questions put to rest with studies showing that biotechnology-derived products are economically viable, environmentally sustainable and as safe as their conventional counterparts.

Most African countries have been reluctant to adopt biotechnology-derived products as policy makers are confronted with contradictory sources of information. Scientific facts are often mixed with social, ethical and ideological considerations.

In the face of a rapidly growing population, declining agricultural productivity and reduced resources available for agricultural research, policy makers are pressed to make the right decisions and are looking for guidance. A case in point is the establishment of the High-Level African Panel on Modern Biotechnology set up by the African Union to advise African heads of state on a common stand on biotechnology. At the country level, there is a need for national scientists and experts to provide policy makers and the general public with evidence-based information, which is needed to harness such technologies.

The Open Forum on Agricultural Biotechnology in Africa (OFAB)

AATF established a platform that aims at facilitating the flow of information from the scientific community to policy makers and the general public. The platform, known as the Open Forum on Agricultural Biotechnology in Africa (OFAB), was launched in Nairobi in September 2006. It brings together stakeholders in biotechnology and enables interactions between scientists, journalists, civil society, industrialists, lawmakers and policy makers.

The Forum provides an opportunity for key stakeholders to get to know one another, share knowledge and experiences, make new contacts and explore new avenues of bringing the benefits of biotechnology to the African agricultural sector. It is structured around a lunch meeting held on the last Thursday of every month at a designated venue. This regularity allows for advance planning by participants and helps to ensure attendance.

Scientists are encouraged to take advantage of the meetings to share interesting ideas from their research, catch up on each other's progress, and serve as resource persons to those with questions that need scientific answers.

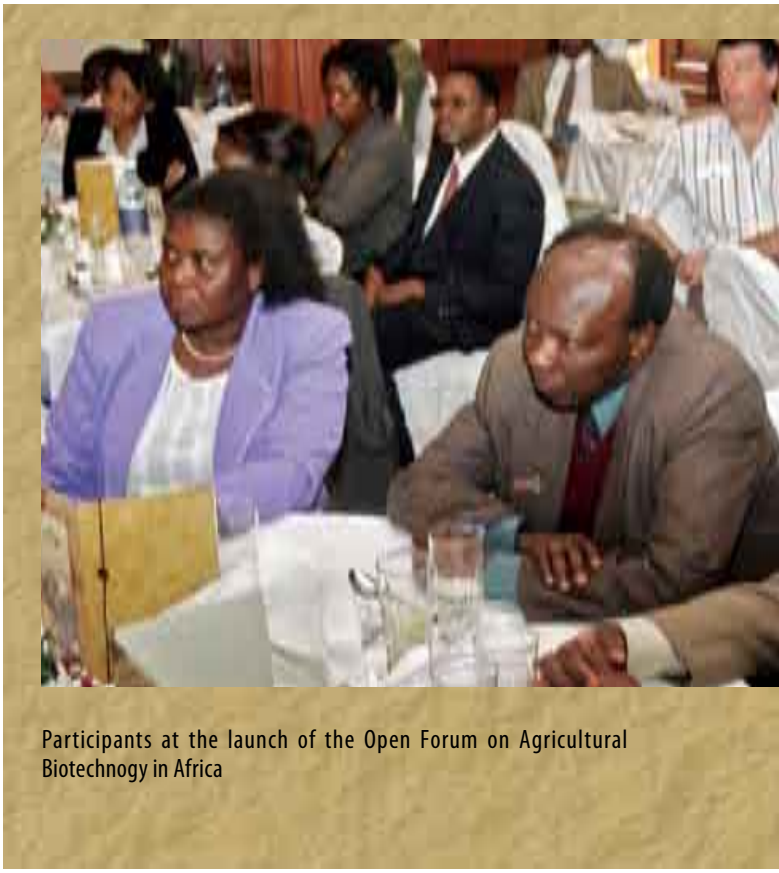
The OFAB was initiated in response to the need for a better understanding of a range of products, benefits and concerns associated with biotechnology, and to provide an opportunity to African agricultural scientists and experts to bring the benefit of their knowledge to bear on the finding of solutions to Africa's development problems. It seeks to ensure that a critical mass of knowledge possessed by scientists is made available to policy makers and the general public.

A committee of scientists and policymakers from Kenya's Ministry of Agriculture, the Kenya Agricultural Research Institute (KARI), International Maize and Wheat Center (CIMMYT), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Kenyatta University manage the agenda and format of the meeting, under the chairmanship of the International Service for the Acquisition of Agri-biotech Applications (ISAAA).

The Nairobi Forum is the first of several to be established in major urban centres of Sub-Saharan Africa. It was launched in Nairobi by Kenya's Minister for Science and Technology, Hon Dr Noah Wekesa, who said the forum would give scientists an opportunity to bridge the gap between people strongly for and against using biotechnology. The selection of Nairobi as the first city to host the initiative in the region was influenced by the presence of a large number of centres of excellence in biotechnology research and development – 15 research institutes, 35 research organisations (mainly international), and nine fully-fledged universities – and a large number of scientists and experts who can provide answers to many of the questions of interest to the general public regarding biotechnology.

Between September and December of 2006, three meetings of the OFAB were held, each bringing together between 40 and 70 participants. Various topics were covered during the three sessions. At the September launch, participants listened to two international speakers. A former European Commission adviser on Biotechnology, Agriculture and Food (Directorate of Life Sciences), Mr Mark F Cantley, spoke on 'Public policy for biotechnology: International lessons from European experience' and also urged African governments to realign their structures to reflect new technologies – including biotechnologies – which their economies must adopt. South African venture capitalist Wellington Chadehumbe spoke on 'Truth, Freedom and Growth' as they relate to decision making and action, and also said that the forum was a perfect example of Africans stepping up to the plate to counter challenges affecting African people. In October, the Kenya Agricultural Research Institute (KARI), Thika Centre Director, Dr Charles Waturu, presented an update on the *Bt* cotton trials in Kenya and in November, the Deputy Director, African Biotechnology Stakeholders Forum (ABSF), Mr Lucas Sese, made a presentation on 'Intellectual Property Rights and Agriculture: Role and Implications on Biotechnology Research, Development and Innovation'.

For AATF, information and knowledge sharing is a critical element in its everyday activities. It recognises the enormous amount of knowledge that is held by others that can and should be tapped to inform and, where possible, hasten decisions that may have implications for large numbers of people in the region. Facilitating informed decision making by policy makers and regulatory agencies will contribute greatly to improving the responsible use of advanced agricultural technologies on behalf of Sub-Saharan Africa's resource-poor smallholder farmers. Stakeholders should be made aware of opportunities offered by agricultural biotechnology, how it can be domesticated, the implications of domestication, and how perceived risks could be minimised and benefits for farmers maximised.



Participants at the launch of the Open Forum on Agricultural Biotechnogy in Africa

Bridging the Gap to New Technologies for Smallholder Farmers in Africa:

AATF Strategy (2007–2015)

From its inception in 2003, AATF has followed the operational guidelines established in its original business plan, making adjustments as needed based on experience. By 2006, it was time to develop an overall strategy that will guide the work of the Foundation for at least the following 10 years – a strategy based not only on conceptual principles and innovative ideas as expressed in AATF's business plan, but also (and very importantly) on the organisation's real-world experiences during its first three years of operation.

The strategy, titled *Bridging the Gap to New Technologies for Smallholder Farmers in Africa: AATF Strategy (2007–2015)*, is aimed at two primary audiences. The first includes the numerous and very diverse stakeholders that can affect, and be affected by, AATF's activities. The second is AATF itself. The strategy clearly establishes the Foundation's priorities and strategic operational framework, and is meant to serve staff as a critical reference point as they engage partners and work towards the AATF vision and mission. It provides staff (and the Foundation's stakeholders and partners) with a precise description of the principles that drive the AATF agenda, the strategic directions (pathways) of the Foundation, the activities it will pursue (thrusts) and how it will do so.

The Strategy Development Process

AATF's strategy was developed through intensive internal discussions with staff and a series of comprehensive external stakeholder consultations. In early 2006, successive internal brainstorming sessions were held in which staff reviewed past achievements and challenges, discussed and debated strategies and objectives, and conducted an in-depth analysis of the Foundation's strengths, weaknesses, opportunities and threats.

In June 2006, a three-day strategy planning workshop was held in Nairobi involving public- and private-sector representatives from the fields of agricultural research, regulatory enforcement, intellectual property protection, technology acceptance, agro-industry, seed delivery systems, and agricultural communications. The workshop focused on assessing current trends and key challenges in these fields, as well as identifying and debating AATF's

For tomorrow belongs to the people who prepare for it today.

African Proverb

strategic goals, organisational issues, and relevant resource considerations (financial and human).

In October, another stakeholder meeting was held to review the draft strategy and its implications for the future of AATF. And at the end of 2006, a strategy review and consultation was held via email with a large number of stakeholders and partners. The inputs from this last round of consultation were carefully considered and, in many cases, helped to shape the refined strategy document that was developed for Board review and approval. The planning process revealed six bedrock principles that motivate decision making relative to the AATF agenda:

1. The Foundation is itself a response to the growing sense of urgency in many quarters about the role of agriculture in Africa's economic development, and especially the recognition that new approaches to technology development and delivery are required.
2. AATF strongly believes that if African agriculture is to provide secure livelihoods for farm households and contribute to economic growth, then the private sector must play a much more important role in technology development for, and delivery to, smallholder farmers.
3. This belief in the potential contributions of the private sector to achieving overall economic development goals is combined with a commitment to re-invigorating the role of public sector organisations in African agriculture, ensuring that public institutions support and participate in the development of markets and policies that contribute to equitable development.
4. AATF focuses its attention on innovative proprietary technologies that are currently not readily available to African farmers, especially the resource-poor smallholder farmers who comprise the bulk of the continent's agricultural producers. Such technologies tend to encourage commercial, market-oriented farming activity and can thus help to re-energise African agriculture.
5. The Foundation is committed to the adoption and use of new agricultural technologies, and to facilitating the adoption process by intervening when necessary to provide stewardship and ensure that new technologies are deployed and used appropriately.
6. AATF is committed to fostering partnerships that are based on real incentives, including the desire of emerging African enterprises to grow and prosper; the interest of farmers in acquiring more productive technologies to improve their food security and incomes; and the commitment of donors and governments to assist resource-poor farm households in gaining market access and experience, and in building their asset base in order to move towards prosperity.

AATF's Strategic Pathway

During the strategic planning process, AATF staff and stakeholders identified and debated a number of alternative paths that the Foundation could follow in the pursuit of its vision and mission. The preferred pathway that emerged from the planning process comprises three major elements:

1. The efficient management of strategic partnerships;
2. The effective stewardship of new technologies and intellectual property; and
3. The management of information and knowledge in ways that:
   - facilitate the selection of technologies that are best suited to smallholder farmers' conditions
   - build partnerships for product development and deployment
   - ensure appropriate stewardship
   - support a favourable policy environment

The Foundation's Strategic Thrusts

AATF's future activities will be inextricably linked to three strategic thrusts:

1. *AATF will negotiate access to proprietary technologies that enhance the productivity of agriculture in Africa.* The Foundation will keep abreast of the latest information about agricultural production constraints and

priorities in Africa and be familiar with major national, regional and Africa-wide policies on agricultural development. It will actively prospect for appropriate new technologies and negotiate with technology owners to obtain royalty-free access to them. AATF will focus most of its attention to proven technologies, rather than those under development.

2. *AATF will enter into partnerships aimed at project formulation, product development, and product deployment as it pursues its objective of introducing innovative agricultural technologies into African farming systems.* The Foundation will identify and develop partnerships with the most appropriate organisations for product development. These may be public or private organisations at the national or international level. AATF's attention to product delivery will include working with partners to strengthen retail distributorships or access to complementary inputs at reasonable prices. Partnerships may also include investments for information provision (such as farm-level demonstrations). AATF will ensure that intellectual property management is addressed and will help its partners comply with relevant regulatory and biosafety regimes. It will ensure that its partners invest the required resources in product stewardship and will develop workable liability protection arrangements.
3. *AATF will manage knowledge and information in ways that support and facilitate the identification, development and deployment of appropriate technologies and a conducive policy environment.* AATF will develop access to information on production constraints in African agriculture, on the technical characteristics of candidate technologies, and on relevant regulatory, biosafety and IP requirements. The Foundation will also develop its own knowledge base about issues related to the enabling environment for agricultural technology. AATF will provide stakeholders with information on its performance and potential and will also ensure that it provides information about the potential and performance of its products to those who are concerned about issues relating to biotechnology and broader agricultural technology development.

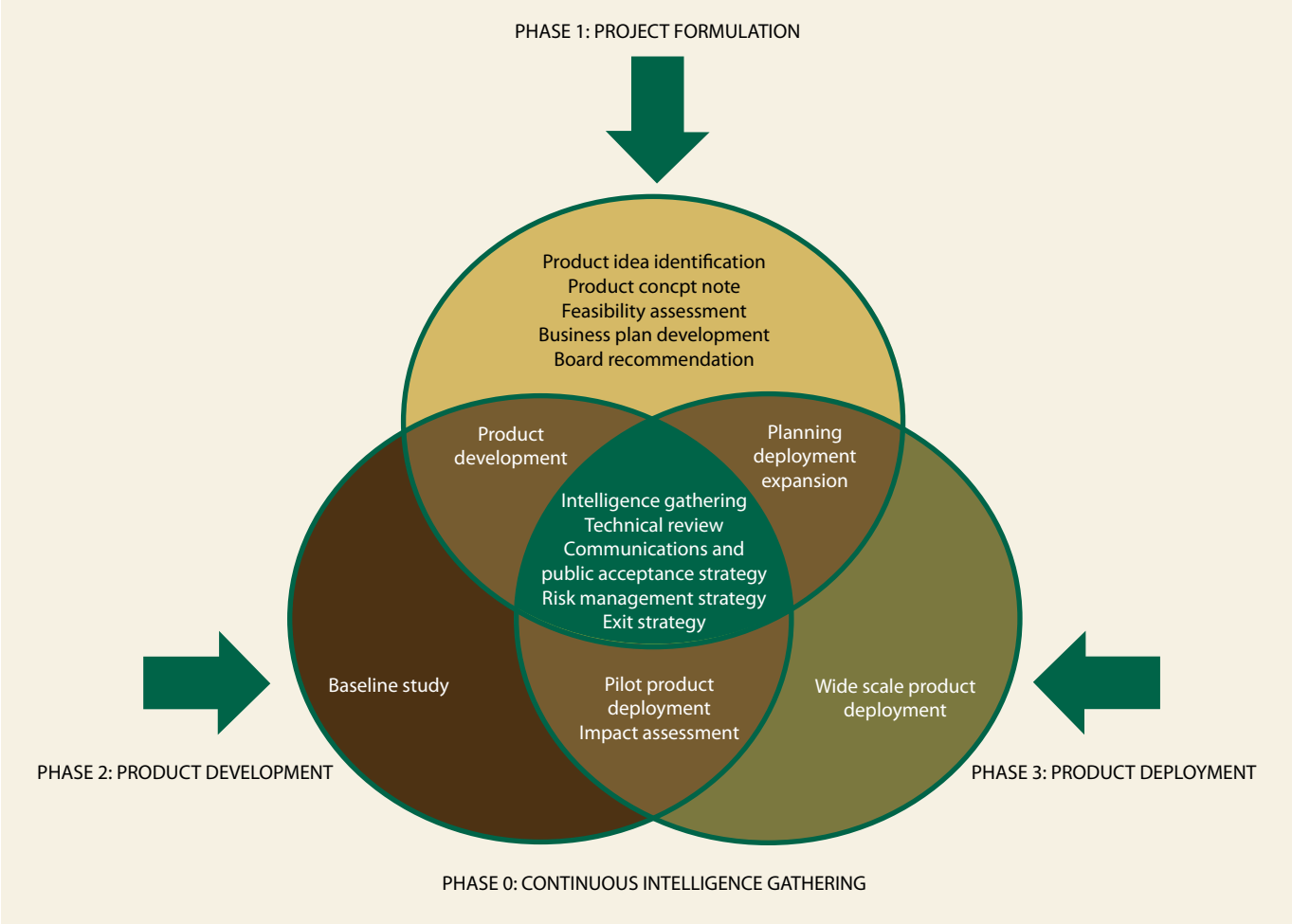


Figure 1. Interactions of phases and steps of the AATF Project Life Cycle

Strategy Implementation

The implementation of AATF's strategy will be carried out in the context of the Foundation's Project Life Cycle (see Figure 1), which involves a number of interrelated activities that range from generating ideas for projects to address specific challenges to eventually bringing those projects to a close. The Foundation's Project Life Cycle rests on a continuous effort by staff to gather intelligence on technological breakthroughs, both locally and internationally, with a view to generating ideas that can be nurtured into projects for addressing constraints to agricultural productivity in Sub-Saharan Africa.

Looking Forward

The decade covered by the AATF strategy will be a period of significant growth and learning for the organisation. New technologies, institutions and practices will emerge that will contribute to Africa's farm households becoming more prosperous and playing a larger role in the development of robust, food-secure national economies. New challenges will also no doubt come to the fore as current problems are resolved, and it is likely that the environment in which AATF operates will change.

AATF will need to evolve in response to these changing circumstances. Over time, the Foundation's focus on improved technologies for food crops important to resource-poor farmers may expand to non-food and/or export crops or other agricultural enterprises that can also contribute to eliminating rural poverty in Africa. Commercial enterprises that serve African farmers (such as seed companies and engineering firms) are expected to grow in number and strength, providing opportunities for a wider range of partnerships. Public research institutions will increasingly develop closer links with those who can deliver their innovations in the market. Africa's legal and regulatory institutions are expected to become stronger and more experienced, making the facilitation of product development and deployment easier.

Looking forward, AATF must have, and will continue to develop, close working relationships with an exceptionally wide range of stakeholders. It will manage its partnerships in ways that will ensure effective stewardship in the development and deployment of specific products. It will become a reliable source of information and knowledge regarding all aspects of the technology transfer process. And above all, it will remain a forceful advocate for the continent's resource-poor smallholder farmers and their needs for technologies targeting their constraints.

Unless you call out, who will open the door?

Ethiopian Proverb

2006 Highlights

March
- AATF and the Forum for Agricultural Research in Africa (FARA) signed a Memorandum of Understanding that governs their collaborative efforts
- A *Striga* Project stakeholders' workshop was held in Kisumu, Kenya, in order to share results from the Project baseline study as well as the experiences of those involved in the work
- A tripartite consultative meeting (AATF, WARDA and Arcadia Biosciences) on improving rice productivity in nitrogen-deficient and saline environments of Sub-Saharan Africa was held in Cotonou, Benin.

April
- AATF and the Centre National de Recherche Agronomique (CNRA), Côte d'Ivoire signed a Memorandum of Understanding to facilitate collaboration.

May
- AATF was granted tax-exempt status in the United States under Section 501(c)3 of the Internal Revenue Code

June
- The Government of Kenya granted AATF 'host country' status, officially recognising the Foundation as an international organisation in Kenya
- AATF held the first stakeholder consultation workshop to identify key issues towards setting its strategic plan for 2007–2015 in Nairobi, Kenya

July
- AATF facilitated the fourth meeting of the African Union–New Partnership for African Development (AU–NEPAD) High-Level Panel on Modern Biotechnology, held in Nairobi, Kenya. The panel was established to provide the AU, NEPAD and African governments with independent and strategic advice on developments, and the wide range of opportunities presented by modern biotechnology for the improvement of agricultural productivity, public health, industrial production and economic competitiveness, as well as the promotion of environmental sustainability
- AATF and the West and Central African Council for Agricultural Research and Development (CORAF/WECARD) signed a Memorandum of Understanding to guide their joint efforts

August
- AATF and Academia Sinica signed a royalty-free Technology License Agreement in Taipei, Taiwan, giving the Foundation access to Academia Sinica's plant ferrodoxin-like protein (*pflp*) gene from sweet pepper for banana transformation to produce banana varieties resistant to banana bacterial wilt

September
- AATF launched the Open Forum on Agricultural Biotechnology in Africa (OFAB), Kenya chapter, in Nairobi at a ceremony presided over by the Minister for Science and Technology, Hon Dr Noah Wekesa

October
- AATF held the second stakeholder consultation workshop on its proposed 2007–2015 strategic plan
- A stakeholder consultative meeting on the *Bt* Cowpea Project was held in Abuja, Nigeria
- AATF and Arcadia Biosciences signed a 'Heads of Agreement' framework that will guide the development of future license agreements to govern the use of proprietary nitrogen use efficiency and salt tolerance genes in rice

December
- A Freedom-to-Operate assessment for the banana bacterial wilt project was completed by the Intellectual Property and Business Formation Legal Clinic of the University of Missouri Law School
- Strigaway® maize was commercially launched in Kisumu, Kenya
- AATF became an Associate Member of the Association of International Agricultural Research Centers (AIARC)
- His Excellency President Olusegun Obasanjo of Nigeria commended the innovative institutional structure of AATF as a major step forward in improving food security in Africa at the Heads of State and Government Summit on Food Security in Africa held in Abuja, Nigeria

1. Dr Monty Jones (left), Executive Secretary of FARA, and Dr Mpoko Bokanga, Executive Director of AATF, sign a memorandum of understanding to collaboratively raise agricultural productivity in Africa (Accra, March)
2. Dr Paco Sereme, Executive Secretary CORAF/WECARD, and Dr Mpoko Bokanga, Executive Director AATF, sign a memorandum of understanding to guide their joint efforts (Nairobi, July)
3. Participants at the Strigaway® maize commercial release in Kisumu, Kenya
4. Participants at the fourth meeting of the AU-NEPAD High-Level Panel on Modern Biotechnology (Nairobi, July)
5. Kenya's Minister for Science and Technology, Hon Dr Noah Wekesa, addresses participants during the launch of the Open Forum on Agricultural Biotechnogy (Nairobi, September)
6. Nancy Terryn, University of Ghent, Belgium, gives a report from her group during the AATF strategic planning meeting (Nairobi, June)
7. Kenya's Minister for Foreign Affairs, Hon Raphael Tuju (right), and AATF's Executive Director, Dr Mpoko Bokanga, sign an agreement granting the Foundation the right to set up its headquarters as an international organisation in Kenya (Nairobi, June)
8. Participants at the AATF strategic planning meeting (Nairobi, Kenya)

The moon moves slowly, but it crosses the town.

Ashanti (Ghana) Proverb

Financial Report

This audited Financial Statement covers the period from January 2006 through December 2006 and provides comparative data for the period from January 2005 through December 2005 as well as for the 16-month period from September 2003 through December 2004.

Income

Total income received for this period from development partners amounted to US$ 3.641 million. This is an income increase of nearly 74% comparing with year 2005 reflecting the growing scope of our activities.

Expenditures

Overall expenditures for the period totalled US$ 3.697 million, slightly more than total income. The deficit was mainly due to depreciation and amortisation. These accrued costs did not have an impact on cash flow. About 77% of total expenditures were devoted to project activities, with 23% going to support services (down from 34% in 2005). Outsourced research activities represent 43% of project expenditures and 33% of the Foundation's total expenditures for the year, demonstrating AATF's commitment to fully developing its programmatic activities.

It is no shame at all to work for money.

Ashanti (Ghana) Proverb

Financial summary

	2006 (US$)	2005 (US$)	2003-2004 (US$)
Income			
Grants	3,595,458	2,075,219	2,665,640
Other income	45,345	19,040	13,593
Total income	3,640,803	2,094,259	2,679,233
Expenditures			
Project related expenses	2,836,385	1,452,307	1,300,780
Management and general expenses	860,548	754,160	793,062
Total expenditure	**3,696,933**	**2,206,467**	**2,093,842**
Surplus/(deficit) for the period	***(56,130)***	***(112,208)***	***585,391***

Statement of financial position (abridged version)

As of 31 December 2006

	2006 (US$)	2005 (US$)	2003-2004 (US$)
Assets			
Non current assets			
Equipment and motor vehicles	56,789	93,143	93,075
Intangible assets	–	3,992	9,952
	56,789	**97,135**	**103,027**
Current assets			
Bank and cash	562,777	532,322	469,208
Accounts receivables	408,435	193,903	312,393
	971,212	**726,225**	**781,601**
Total assets	**1,028,001**	**823,360**	**884,628**
Liabilities and fund balances			
Current liabilities			
Accounts payable & accrued expenses	457,329	196,558	145,618
Total liabilities	**457,329**	**196,558**	**145,618**
Fund balances			
Restricted	206,728	152,758	29,907
Unrestricted	363,944	474,044	709,103
Total fund balances	**570,672**	**626,802**	**739,010**
Total liabilities and fund balances	***1,028,001***	***823,360***	***884,628***

AATF – People Working Together

It has long been recognised that people are the most valuable asset of any organisation. AATF is particularly aware of how the knowledge, skills and motivation of individuals within the organisation directly affect bottom-line performance and overall job satisfaction. Effective human resources are vital in providing high quality services and achieving more productive outcomes. Therefore, the impact AATF interventions have on smallholder farmers and the quality of their services is primarily dependant on the quality of its human resources. In order to fully capitalise on this asset, AATF has invested heavily in nurturing human resources within the organisation.

Building cohesion and thus enhancing performance in an organisation is a direct result of creating a culture conducive to accomplishing the organisation's goals through a common vision.

The culture of an organisation refers to the unique configuration of norms, values, beliefs and ways of behaving that characterise the manner in which groups and individuals combine to get things done.[3]

Performance is affected by the organisation's culture, which exerts an influence on organisational behaviour. A critical component in creating an enhanced working environment is through the organisation's culture and an agreed set of shared values.

AATF decided to determine what was of value and importance to the organisation and its employees through a bottom-up analysis. In doing so, it set out to create an organisational culture that would ultimately benefit management, partners, stakeholders, beneficiaries and employees. Employee's opinions provided the basis for identifying the core values of AATF and, through the involvement of staff in the analysis the Foundation secured the commitment of staff to those values.

3. Eldridge, J and Crombie, A (1974) *The Sociology of Organizations,* Allen & Unwin, London.

The shared values identified by AATF staff are Integrity, Dedication and Accessibility (known in AATF as 'IDA')

Integrity – *'We keep our word'. AATF employees uphold integrity and are honour-bound by their word. They adhere to moral principles in dealing with themselves, partners and other stakeholders. They seek to be honest, transparent and accountable.*

Dedication – *'We are responsible partners'. AATF is a responsible partner, committed to ensuring that its intended beneficiaries are well served. The Foundation seeks to maintain good relations with partners, investors, staff and other stakeholders to help ensure maximum realisation of potential for the common good.*

Accessibility – *'We are available and approachable'. AATF makes its data, information and knowledge readily and freely available to all those involved in the overall agricultural revival of Sub-Saharan Africa.*

When there is no enemy within, the enemies outside cannot hurt you.

African Proverb

AATF Board Members 2006

1. Jennifer Ann Thomson (Board Chair), Professor of Molecular and Cell Biology, University of Cape Town, Cape Town, South Africa
2. Walter S Alhassan (Board Vice-Chair), Coordinator, Agricultural Biotechnology Support Project II (ABSPII), West and Central African Sub-regional Coordinator, Programme for Biosafety Systems (PBS) Accra, Ghana
3. Mpoko Bokanga, Executive Director, African Agricultural Technology Foundation, Nairobi, Kenya
4. Vincent Gwarazimba, Director, Nhimbe Agro Systems, Harare, Zimbabwe
5. Assétou Kanouté, Coordinator, Reseau Ouest et Centre Afrique pour la recherché participative agricole/West and Central Africa Network for the Promotion of Participatory Agricultural Research (ROCAPA/WECANPAR), Bamako, Mali
6. Kevin B Nachtrab, Senior Patent Counsel, Johnson & Johnson, Belgium
7. Eugene Terry, Atecho & Associates, Washington DC, USA
8. Wilson Songa, Agriculture Secretary, Ministry of Agriculture, Nairobi, Kenya
9. Michael W Trimble, Director, Trimble Genetics International, Johnston, Iowa, USA
10. Alhaji Bamanga Mohamed Tukur, Group Chairman, BHI Holdings Limited (Daddo Group of Companies), Lagos, Nigeria

If you understand the beginning well, the end will not trouble you.

Ashanti (Ghana) Proverb

AATF Staff 2006

1. Mpoko Bokanga, Executive Director
2. Hodeba Jacob D Mignouna, Technical Operations Manager
3. Richard Boadi, Legal Counsel
4. Francis Nang'ayo, Regulatory Matters Specialist
5. Gospel Omanya, Projects Manager
6. Nancy Muchiri, Communications and Partnerships Manager
7. Moussa Elhadj Adam, Administration and Finance Manager
8. Zainab Ali, Special Assistant to the Executive Director
9. Peter Werehire, Publications and Website Officer
10. Martin Mutua, Accounting Officer
11. Samuel M Kariuki, Administrative Assistant
12. Joan Abila-Oballa, Administrative Assistant
13. Monity Odera (left in year), Research and Documentation Officer
14. George Njogu, Driver
15. Gordon Ogutu, Liaison Assistant/Driver

AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
FONDATION AFRICAINE POUR LES TECHNOLOGIES AGRICOLES

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